



Military Munitions Response Program Site Prioritization Protocol

12 August 2003



Site Prioritization Protocol: Requirements

- ▶ Codified in U.S. law (10 USC § 2710(b))
- ▶ Develop, in consultation with States and Indian Tribes, a proposed protocol for assigning to each munitions response site a relative priority for response activities related to unexploded ordnance, discarded military munitions, and munitions constituents
- ▶ Formal public notice and comment on proposed Protocol
 - Publication in the *Federal Register*
 - OADUSD (E) directed Protocol to be promulgated as a Federal regulation
- ▶ Respond to comments; revise protocol as necessary
- ▶ Formally issue and apply final Protocol
- ▶ Codify in U.S. Code of Federal Regulations (32 CFR Part 179)



Site Prioritization Protocol: Consultations

- ▶ Requirement for consultation with States and Tribes
 - State agency consultation
 - Letters to States and territories
 - Two State consultation meetings
 - Presentations at ASTSWMO meeting, Munitions Response Committee
 - Tribal government consultation
 - Letters to Tribal governments
 - Two Tribal consultation meetings
 - Met with Tribal representatives, presentations at NCAI meeting
- ▶ DoD expanded to consult with Federal agencies and the public
 - Federal agency consultation
 - Met with EPA, USDA, USDOE, and USDOJ
 - Briefings at Munitions Response Committee (MRC)
 - Public
 - *Federal Register* notice
 - Public Web site
 - Presentation at UXO Forum
 - SAME meetings



Site Prioritization Protocol: Parameters

- ▶ Priority to be based on conditions at each site
- ▶ Consider safety, environmental hazards, and other relevant factors
- ▶ Use consistent factors, terminology and definitions
- ▶ Distribute identified sites across the scale of priorities
- ▶ Acceptance by internal and external stakeholders
- ▶ Operability with limited data
- ▶ Simple to use, simple to understand
- ▶ Recognize regulatory realities
- ▶ Separate decisions regarding priority from decisions regarding need for action
- ▶ Maximize consistency with existing methods
- ▶ Maximize use of existing data at 1,000+ sites
- ▶ Minimize needs for new data



Comments Received to Date

- ▶ About 200 comments received since April 2002
 - Often multiple comments from different sources addressing same issue
 - Many addressed the conceptual ideas discussed early in development
 - Others addressed previous versions of the Protocol
 - Others were anecdotal information about specific sites, related to the inventory, or related to other topics outside scope of Protocol
- ▶ Throughout this presentation, specific comments may be referenced and discussed
- ▶ Comments are not referenced with respect to the source



Overview of Preamble to Proposed Rule

- ▶ Summary
- ▶ Definitions
- ▶ Background
- ▶ Development of Protocol
- ▶ Locations subject to Protocol
 - Defense Sites
 - Munitions Response Areas
 - Military Munitions Response Sites
- ▶ Application of the Protocol
- ▶ Protocol Modules
 - Explosive Hazard Evaluation
 - CWM Hazard Evaluation
 - Relative Risk Site Evaluation
 - Combining outcomes to determine Site Priority
- ▶ Schedule for application of the Protocol and addressing “Evaluation Pending” sites
- ▶ Protocol testing methodology
- ▶ Site Sequencing
- ▶ Consultation
 - States
 - Tribes
 - Federal Agencies and Public
- ▶ Administrative requirements
 - Regulatory Impact Analysis
 - Regulatory Flexibility Act
 - Unfunded Mandates
 - Paperwork Reduction Act
 - National Technology Transfer and Advancement Act
 - EO 12898: Environmental Justice
 - EO 13132: Federalism

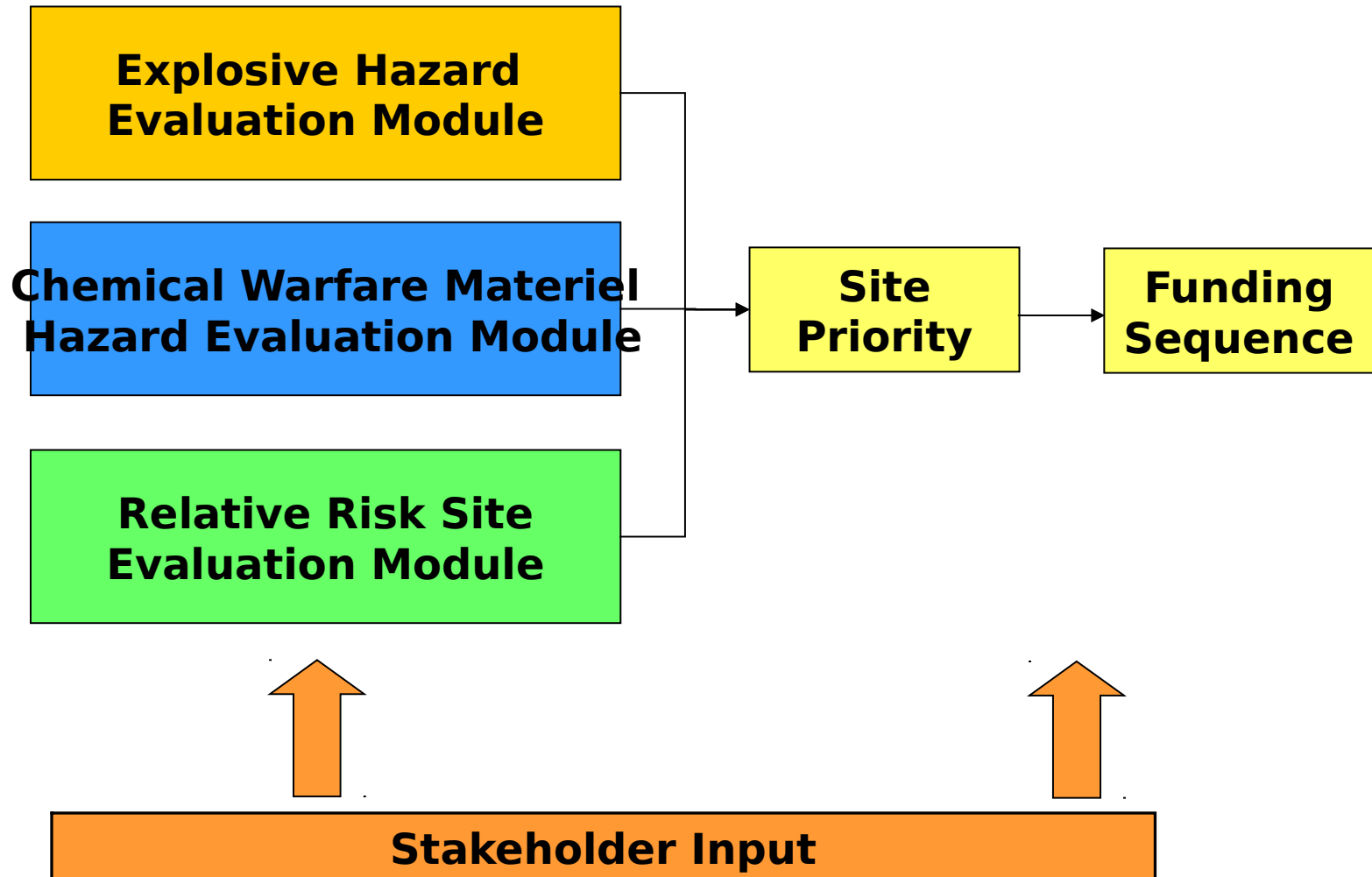


Overview of Proposed Rule

- ▶ Purpose
- ▶ Applicability and Scope
 - Locations covered
 - Locations excluded
- ▶ Definitions
- ▶ Policy
- ▶ Responsibilities
- ▶ Procedures
 - EHE module
 - CHE module
 - RRSE module
 - Combining
 - Considering other factors in sequencing
- ▶ Appendix A (tables from modules)



Overall Protocol Structure





Locations Pertinent to Protocol

- ▶ Defining the universe of locations at which the Protocol will be applied required reconciliation of the terms and requirements of 10 USC § 2710:
 - Term “defense site”
 - Defined in 10 USC § 2710 (e) based on real property interest
 - “... locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense.
 - Does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions.”
 - Inventory requirement under 10 USC § 2710(a) defined based on property interest plus presence of specific items: “...develop and maintain an inventory of defense sites that are known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents”
 - Requirement for application of the Protocol in 10 USC § 2710(b) based on locations included in the inventory: “... apply the final protocol to all defense sites listed on the inventory required under section 311(a)”

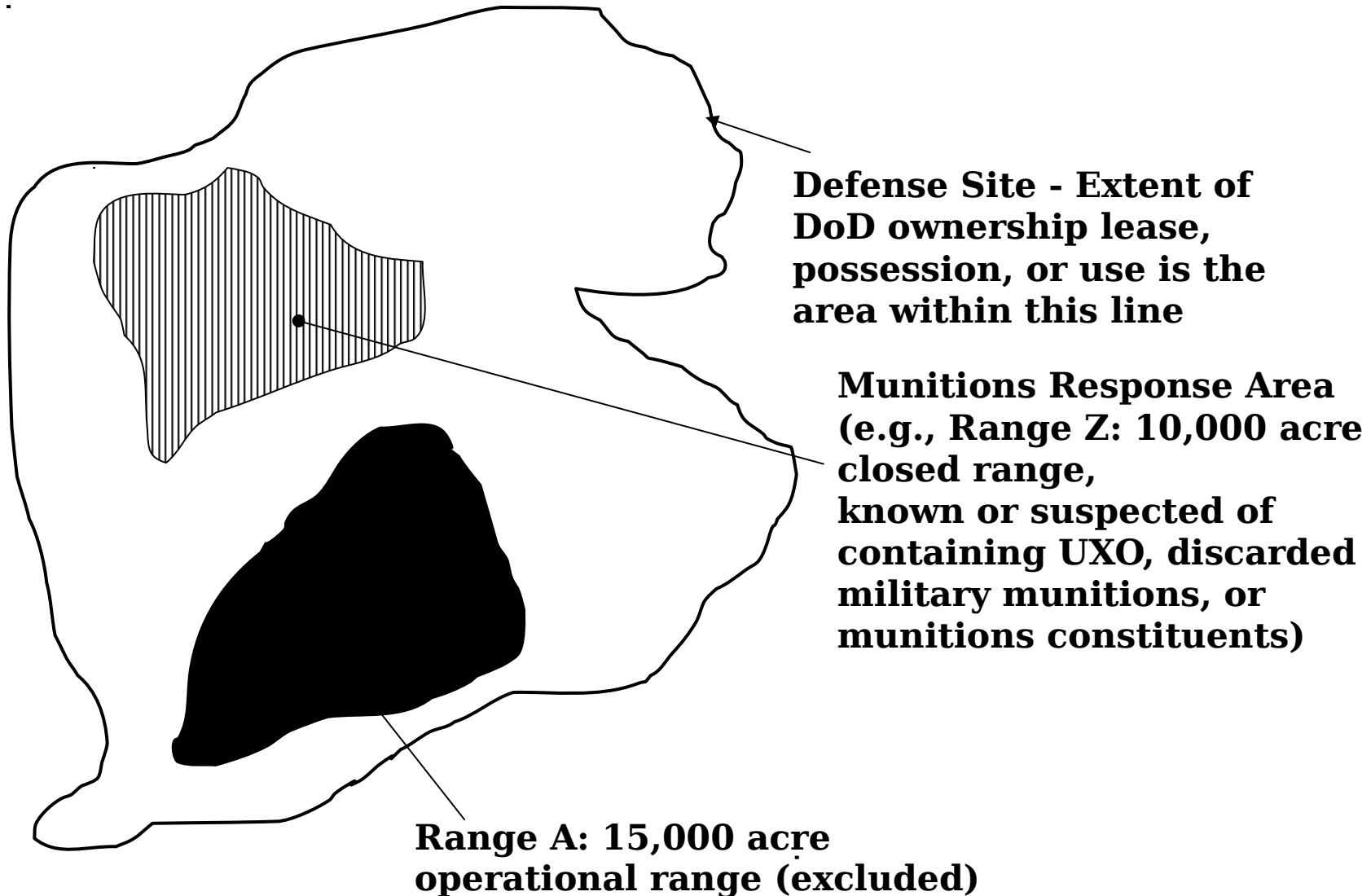


Locations Pertinent to Protocol (cont.)

- ▶ The Protocol will be applied to all locations that are:
 - Currently or previously owned by, leased to, or otherwise possessed or used by DoD
 - Known to, or suspected of, containing unexploded ordnance, discarded military munitions, or munitions constituents, and
 - Included in the inventory of defense sites.
- ▶ To describe these locations, DoD developed two terms:
 - *Munitions response area (MRA)*
 - Any area on a defense site that is known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents (e.g., former ranges or munitions burial areas)
 - Comprised of one or more munitions response sites
 - If an MRA is subdivided into MRSs, the total area originally identified as the MRA must continue to be accounted for and addressed.
 - *Munitions response site (MRS)*
 - A discrete location within an MRA that is known to require a munitions response
 - Protocol applied at the MRS level.



Locations Pertinent to Protocol (cont.)





Delineation of the “Defense Site”



**Range A: 15,000 acre
operational range**

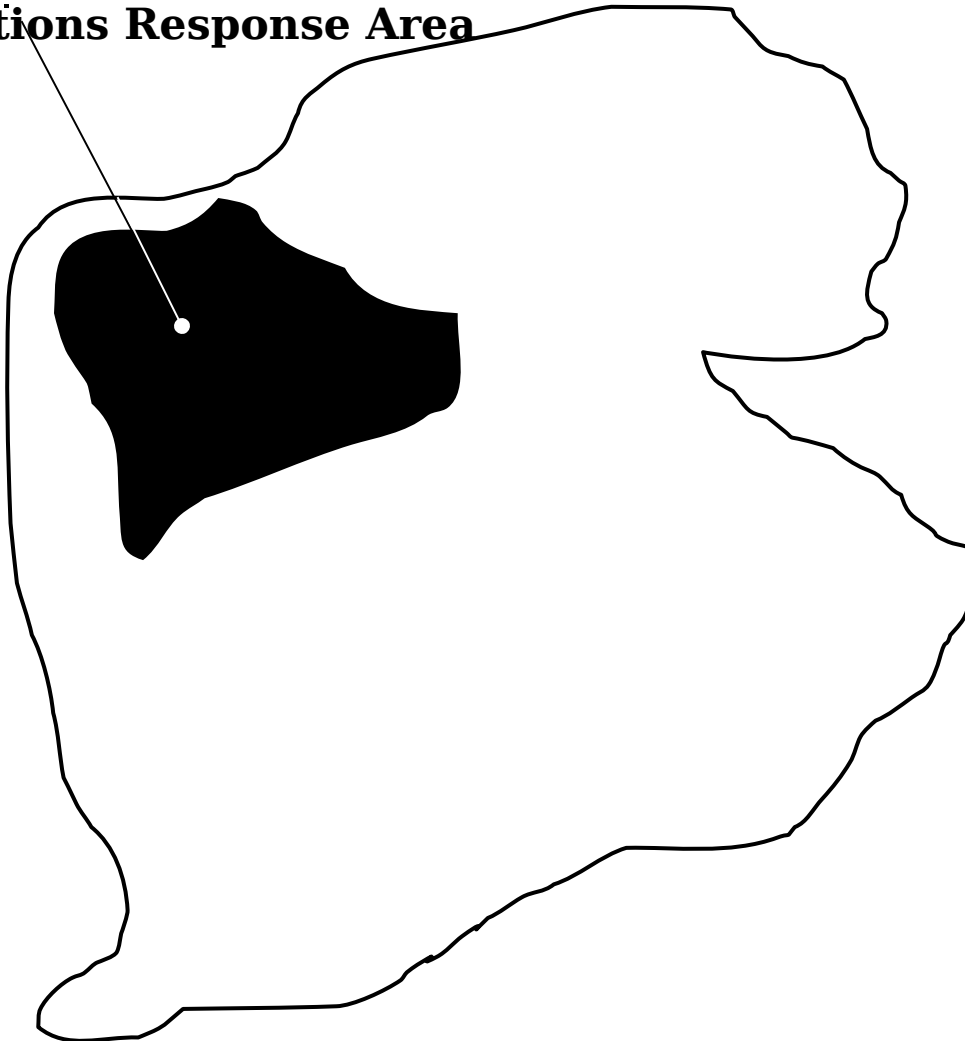
- Locations that are or were owned by, leased to, or otherwise possessed or used by DoD**
- Term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of munitions**
- Extent of the defense site is indicated by the solid black.**

The area of Range A (indicated by horizontal lines) is



Delineation of the “Munitions Response Area”

**Range Z: 10,000 acre closed range.
Munitions Response Area**



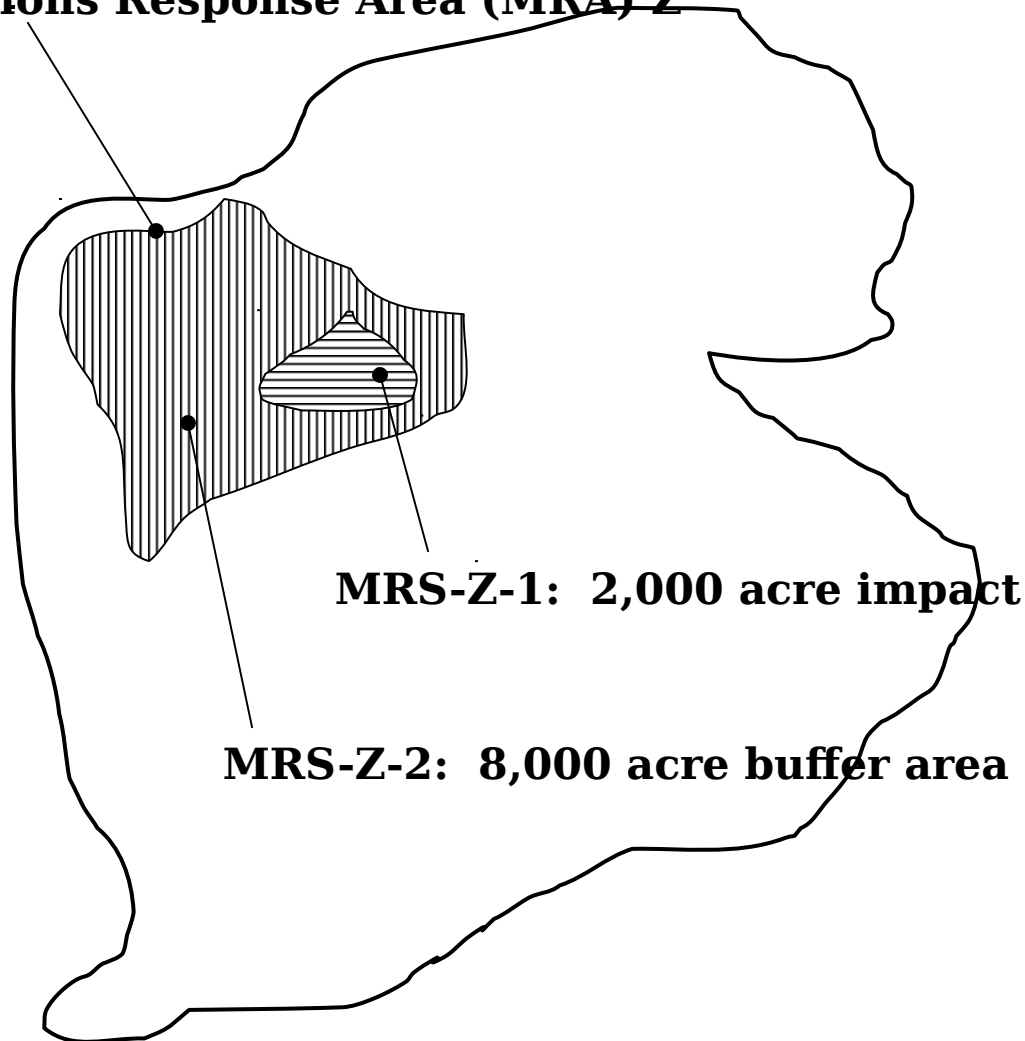
Munitions Response Areas - ... any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples are former ranges or munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

In the diagram, Range Z is known or suspected of containing UXO, DMMs, or MCs. The extent of the MRA is the entire area of Range Z (indicated in solid black). The MRA has at least one MRS,



Delineation of the “Munitions Response Sites”

**Range Z: 10,000 acre closed range.
Munitions Response Area (MRA) Z**



Munitions Response Site (MRS) - A discrete location that, based on investigation or characterization, is known or suspected to contain UXO, DMM, or MC.

In the diagram, the Range Z MRS has been divided into two MRSs: MRS-Z-1 and MRS-Z-2. The two MRSs are indicated by the horizontal and vertical lines. The total area of both MRSs is the entire 10,000 acre MRA.



Protocol: Excluded Locations

- ▶ Not currently, or were not previously, owned by, leased to, or otherwise possessed or used by DoD (by definition not a “defense site”)
- ▶ Not known or suspected of containing military munitions, UXO, discarded military munitions, or munitions constituents (these materials must be known or suspected of being present to be in the inventory)
- ▶ Outside the United States (specifically excluded under 10 USC § 2710(d)(1))
- ▶ Locations where the presence of military munitions is a result of combat operations (specifically excluded under 10 USC § 2710(d)(1))
- ▶ An operating storage and manufacturing facility (specifically excluded under 10 USC § 2710(d)(1) and from definition of “defense site”)
- ▶ Used for, or was permitted for, the treatment or disposal of military munitions (excluded from definition of “defense site”)
- ▶ An operational range (specifically excluded under 10 USC § 2710(d)(1) and from definition of “defense site”)



Definitions Used in Protocol

▶ Definitions from 10 USC § 2710(e):

- Defense site
- Discarded military munitions
- DoD Components
- Military munitions
- Munitions constituents
- Operational range
- Unexploded ordnance
- United States

▶ Definitions from other sources

- *Military range* means designated land and water areas set aside, managed, and used to research, develop, test, and evaluate military munitions, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas. From 40 C.F.R. § 266.201.



Definitions Used in Protocol (cont.)

► Definitions developed for Protocol

- *Barrier* means a natural obstacle or obstacles (e.g., difficult terrain, dense vegetation, deep or fast moving water), a man-made obstacle or obstacles (e.g., fencing), or a combination of natural and man-made obstacles.
- *Chemical warfare materiel (CWM)* is a general term that is comprised of four subcategories:
 - (1) *CWM-explosively configured* are all munitions that contain a chemical warfare materiel (CWA) fill and any explosive component. Examples are M55 rockets with CWA, the M23 VX mine, and the M360 105mm GB artillery cartridge.
 - (2) *CWM-nonexplosively configured* are all munitions that contain a CWA but that do not include any energetic material. Examples are any chemical munition that does not contain explosive components (e.g., a burster, fuze), and VX or mustard agent spray canisters.
 - (3) *CWM-bulk container* are all non-munitions-configured containers of CWA (e.g., a ton containers).
 - (4) *Chemical agent identification sets (CAIS)* are military training aids containing small quantities of various CWA and other chemicals. All forms of CAIS are scored the same in this Protocol, except CAIS K941, toxic gas set M-1; and K942, toxic gas set M-2/E11, which are scored higher due to the relatively large quantities of agent they contain

In the protocol, the general term “CWM” means all four categories. Where the name of one or more of the subcategories is used, the statement is specific to the subcategories specified. For example, the CHE module is used to prioritize an MRS whenever, (i.e., any type) is known or suspected of being present. In the CHE table titled *CWM Configuration*, under the *Description* column, are references to specific subcategories. For example, the row title CAIS applies only to the CAIS subcategory.



Definitions Used in Protocol (cont.)

► Definitions developed for Protocol

- *Cultural Resources* means that they are recognized cultural, spiritual, traditional, religious, or historical features (e.g., structures, artifacts, symbolism) on the MRS. For example, Native Americans to be of religious significance or there are areas that are used by American Indians or Alaska Natives deem the MRS to be of spiritual significance or there are areas that are used by American Indians or Alaska Natives for subsistence activities (e.g., hunting, fishing). Requirements for determining if a particular feature is a cultural resource are found in the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, Archeological Resources Protection Act, Executive Order 13007, and the American Indian Religious Freedom Act.
- *CWM/DMM* means CWM that are discarded military munitions.
- *Ecological Resources* means: (1) a threatened or endangered species (designated under the Endangered Species Act) is present on the MRS; or (2) the MRS is designated as critical habitat for a threatened or endangered species; or (3) there are identified sensitive ecosystems such as wetlands or breeding grounds present on the MRS.
- *Former* (as in "former range") means the MRS is a location that was: (1) closed by a formal decision made by the DoD Component with an administrative control over the location, or (2) put to a use incompatible with the presence of UXO, DMM, or MC.
- *Historical evidence* means that the investigation: (1) found written documents or records or (2) documented interviews of persons with knowledge of site conditions; or (3) found and verified other forms of information.



Definitions Used in Protocol (cont.)

► Definitions developed for Protocol

- *Inhabited structures* means permanent or temporary structures (e.g., schools, churches, residences, offices, aircraft passenger terminals, stores, shops, factories, hospitals, theaters, tents), other than DoD munitions-related structures are routinely occupied by one or more persons for any portion of a day.
- *In the subsurface* means the munition or CWM (i.e., a DMM or UXO) is: (1) entirely beneath the ground surface, or (2) fully submerged in a water body.
- *Munitions response* means response actions, including investigation, removal actions and remedial actions to address the explosives safety, human health, or environmental risks presented by UXO, DMM, or MC.
- *Munitions Response Area (MRA)* means any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges or munitions burial areas. An MRA is comprised of one or more munitions response sites.
- *Munitions Response Site (MRS)* means a discrete location within an MRA that is known to require a munitions response.
- *On the surface* means the munition or CWM (i.e., a DMM or UXO) is: entirely or partially exposed above the ground surface, or (2) entirely or partially exposed above the surface of a water body (e.g., as a result of tidal activity).



Definitions Used in Protocol (cont.)

► Definitions developed for Protocol

- *Physical evidence* means:(1) recorded observations from on-site investigations, such as finding intact UXO or DMM, or components, fragments, or other pieces of military munitions, or (2) the results of field or laboratory sampling and analysis procedures, or (3) the results of geophysical investigations.
- *Practice munitions* means munitions that contain an inert filler (e.g., wax, sand, concrete), a spotting charge (i.e., pyrotechnic charge), and a fuze. For a munition to be classified as a “practice munition,” the fuze cannot be considered “sensitive.”
- *Small arms ammunition* means ammunition that is .50 caliber or smaller and shotgun shells.
- *UXO/CWM* means CWM that are unexploded ordnance.



Application (and Reapplication) of Protocol

- ▶ Protocol shall be applied when there are sufficient data to run at least one of the three hazard evaluation modules
 - Modules with insufficient information assigned “evaluation pending,” and the site’s relative priority assigned based on the modules for which sufficient data were available (if any).
 - Protocol reapplied when data is available for modules in “evaluation pending”
- ▶ Protocol will be reapplied:
 - Upon completion of a response action that could change the potential hazard at the site
 - To update or validate a previous module evaluation at a site when new information is available.
 - To update or validate a priority that was previously assigned based on evaluation of only one or two of the three hazard evaluation modules
 - Upon further delineation and characterization of a munitions response area into munitions response sites.
 - To categorize sites previously classified as “evaluation pending.”



New Topics Addressed

- ▶ Consideration of “other factors”
 - In both preamble and rule
 - Formal requirement to seeking input from other stakeholders, have Management Action Plans, etc., but no rating scale used
 - Formally document sequencing decisions and notify stakeholders of changes due to Component chain-of-command decisions
- ▶ Soliciting comments on dates for completing application of the Protocol
 - For all defense sites in the inventory on May 31, 2003
 - One module completed NLT May 31, 2007
 - All modules completed NLT May 31, 2012
 - For defense sites identified after May 31, 2003
 - One module completed within 2 years of identification or by May 31, 2007, whichever is later
 - All modules completed within 4 years of identification or by May 31, 2012, whichever is later



New Topics Addressed (cont.)

- ▶ Specific DoD Component responsibilities:
 - Ensure that all appropriate regulatory agencies and other affected stakeholders are offered opportunities to participate in the application of this Protocol at the defense sites under its administrative control.
 - Requirement for written invitation to participate in application of Protocol to be sent to State and Native American or Alaskan Native governments.
 - Provide local restoration advisory boards and/or technical review committees opportunity to provide input and to participate in the process and related discussions.
 - Include records related to prioritization in the Administrative Record and the Information Repository.
 - Apply the Protocol to each munitions response area or site in the inventory such that the total acreage of each munitions response area is evaluated.



New Topics Addressed (cont.)

- ▶ Specific DoD Component responsibilities:
 - Establish a quality assurance panel to review all applications of this Protocol
 - May not include any participant applying the Protocol at a specific military munitions response area or military munitions response site.
 - If panel recommends changing to a different priority, the DoD Component shall provide this rationale to the appropriate regulatory agencies and involved stakeholders for comment before finalizing the change.



General Comments

- ▶ Define standards for data quality
 - Defining data quality standards is inappropriate for protocol due to site-specific nature of data needs, but should be addressed in implementing guidance and training
- ▶ Consider future land use
 - Future land use having not been determined at the point when the protocol is being applied was not considered directly, except for consideration of property transferring from DoD control within three years of protocol application
- ▶ Consider changes in uses of adjacent property
 - Changes in use of adjacent properties not directly considered, but would be addressed through annual update process
- ▶ Tailor to specific regions
 - The desire for consistency in the approach and methodology must be balanced against site-specific, State-specific, or region-specific accommodations



Explosive Hazard Evaluation Module





Explosive Hazard Evaluation (EMHE) Ratings

Explosive Hazard

Munitions Type 30	
• Sensitive	30
• High explosive (used or damaged)	25
• Pyrotechnic	20
• High explosive (unused)	15
• Propellant	15
• Bulk HE, pyrotechnics, propellant	10
• Practice	5
• Riot control	3
• Small arms	2
• Evidence of no munitions	0

Source of Hazard 10	
• Former ranges	10
• Former munitions treatment (OB/OD) units	10
• Former practice munitions range	6
• Former maneuver area	5
• Former burial pits or other disposal area	5
• Former industrial operating facilities	4
• Former firing points	4
• Former missile or ADA emplacements	2
• Former storage or transfer sites	2
• Former small arms range	1
• Evidence of no munitions	0

Accessibility

Location of Munitions 25	
• Confirmed Surface	25
• Confirmed Subsurface, active	20
• Confirmed Subsurface, stable	15
• Suspected (physical evidence)	10
• Suspected (historical evidence)	5
• Subsurface, physical constraint	2
• Small arms (regardless of location)	2
• Evidence of no munitions	0

Ease of Access 10	
• No barrier	10
• Barrier is incomplete	8
• Barrier is complete and not monitored	5
• Barrier is complete and monitored	0

Status of Property 5	
• Non-DoD control	5
• Scheduled for transfer from DoD control	3
• DoD control	0

Receptors

Population Density (people/sq mi) 5	
• > 500	5
• 100 - 500	3
• < 100	1

Population near Hazard 5	
• 26 or more inhabited structures	5
• 16 to 25	4
• 11 to 15	3
• 6 to 10	2
• 1 to 5	1
• No known or recurring activities	0

Types of Activities/Structures 5	
• Residential, educational, etc.	5
• Recreation (hiking, hunting, etc.)	4
• Agricultural, forestry, subsistence	3
• Industrial, warehousing	2
• No known or recurring activities	0

Ecological or Cultural Resources 5	
• Ecological and Cultural	5
• Ecological	3
• Cultural	3
• None	0

Total Score from all elements

• Explosive Hazard A (Highest)

>92

• Explosive Hazard B

82 - 91

• Explosive Hazard C

71 - 81

• Explosive Hazard D

60 - 70

• Explosive Hazard E

48 - 59

• Explosive Hazard F

38 - 47

• Explosive Hazard G

(Lowest)



EHE Definitions - Explosive Hazard

► Munitions Type

- **Sensitive:** All UXO that are considered likely to function upon any interaction with exposed persons, including, submunitions; cluster munitions; 40mm high-explosive grenades; white phosphorus (WP) munitions (including practice munitions with sensitive fuzes, but excluding all other practice munitions), and high explosive anti-tank (HEAT) munitions. All hand grenades containing an explosive filler.
- **High explosive (used or damaged):** All UXO containing a high-explosive filler (e.g., RDX, Composition B) that are not considered "sensitive"; and All DMM containing a high explosive filler that have damaged by burning or detonation or that have deteriorated to the point of instability.
- **Pyrotechnic:** All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have damaged by burning or detonation or that have deteriorated to the point of instability.
- **High explosive (unused):** All DMM that contain a high-explosive filler which have not been damaged by burning or detonation or are not deteriorated to the point of instability.
- **Propellant:** All UXO containing only a single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor); all DMM containing only a single-, double-, or triple-based propellant or, composite propellants (e.g., a rocket motor).



EHE Definitions - Explosive Hazard

► Munitions Type (cont.)

- **Bulk HE, pyrotechnics, or propellant:** Bulk high explosives, including: demolition charges (e.g., C4 blocks), high explosives not contained in a munition, and concentrated mixtures of high explosives or other munitions constituents mixed with environmental media or debris in concentrations that result in the mixture being explosive (e.g., explosive soil). All pyrotechnic material that is not contained in a munition (i.e., "bulk pyrotechnics"). All single-, double-, or triple-based propellant, or composite propellants that is not contained in a munition (i.e., "bulk propellant")
- **Practice:** All UXO that are a practice munition not associated with a sensitive fuze. All DMM that are a practice munition not associated with a sensitive fuze that have been damaged by burning or detonation or that have deteriorated to the point of instability.
- **Riot control:** All UXO or DMM containing only a riot control agent (e.g., tear gas).
- **Small arms:** All UXO or DMM that are classified as small arms ammunition. Evidence that no other munitions type (e.g., grenades, subcaliber training rockets, demolition charges) was used on the MRS is required for selection of this category.
- **Evidence of no munitions:** Following investigation of the MRS, there is physical evidence there are no UXO or DMM present or there is historical evidence indicating that no UXO or DMM are present.



EHE Definitions - Explosive Hazard

▶ Source of Hazard

- **Former range:** The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.
- **Former munitions treatment (i.e., OB/OD) unit:** The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.
- **Former practice munitions range:** The MRS is a former range on which only practice munitions without sensitive fuzes were used.
- **Maneuver area:** The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.
- **Burial pits:** The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.
- **Former industrial operating facilities:** The MRS is a location that is a former munitions manufacturing or demilitarization facility.
- **Former firing Points:** The MRS is a firing point, when the firing point is delineated as an MRS separate from the rest of a former range.
- **Former missile or ADA emplacements:** The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a range.
- **Former storage or transfer site:** The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).
- **Former small arms range:** The MRS is a former military range where only small arms were used. There must be evidence that no other type of munitions (e.g., grenades) were used at the location to place an MRS into this category.
- **Evidence of no munitions:** Following investigation of the MRS, there is physical evidence there are no UXO or DMM present or there is historical evidence indicating that no UXO or DMM are present.



EHE Definitions - Accessibility

► Location of Munitions

- **Confirmed Surface:** Physical evidence indicates there are UXO or DMM on the surface of the MRS. Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.
- **Confirmed Subsurface, Active:** Physical or historical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed in the future by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action) or there are on-going intrusive activities (e.g., plowing, construction, dredging) at the MRS that are likely to expose UXO or DMM.
- **Confirmed Subsurface, Stable:** Physical or historical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed in the future by naturally occurring phenomena, or there are no intrusive activities at the MRS that are likely to occur, or if the activities do occur, are likely to cause UXO or DMM to be exposed.
- **Suspected (physical evidence):** There is physical evidence other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.
- **Suspected (historical evidence):** There is historical evidence indicating that UXO or DMM may be present at the MRS.
- **Subsurface, physical constraint:** The physical or historical evidence indicating the UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.
- **Small arms (regardless of location):** The presence of small arms ammunitions is confirmed or suspected, regardless of other factors such as geological stability. There must be evidence that no other types of munitions (e.g., grenades) were used at the MRS to include it in this category.
- **Evidence of no munitions:** Following investigation of the MRS, there is physical evidence there are no UXO or DMM present or there is historical evidence indicating that no UXO or DMM are present at the MRS.



EHE Definitions - Accessibility

▶ Ease of Access

- **No barrier:** There is no barrier preventing access to all parts of the MRS (i.e., all parts of the MRS are accessible).
- **Barrier to MRS access is incomplete:** There is a barrier preventing access to parts of the MRS, but not the entire MRS.
- **Barrier to MRS access is complete, but not monitored:** There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.
- **Barrier to MRS access is complete and monitored:** There is a barrier preventing access to all parts of the MRS, and there is active continual surveillance (e.g., by a guard, video monitoring) to ensure that the barriers are completely effective at preventing access to all parts of the MRS.

The term *barrier* includes natural obstacles (e.g., difficult terrain, dense vegetation, deep or fast moving water), man-made obstacles (e.g., fencing), and combinations of natural and man-made obstacles.

▶ Property status

- **Non-DoD control:** The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by the DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by a Native American or Alaskan Native governments or State or local governments, lands or water bodies managed by other Federal agencies.
- **Scheduled for transfer from DoD control:** The MRS is on land or a water body that is owned, leased, or otherwise possessed by the DoD and DoD plans to transfer that land or water body to control of another entity (e.g., a State, Native American, Alaskan Native, or local government; a private party; another Federal agency) within 3 years from the date the Protocol is applied.
- **DoD controlled:** The MRS is on land or is a water body MRS is that is owned, leased, or otherwise possessed by the DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24-hours per day, every day of the calendar year.



EHE Definitions - Receptors

► Population density

- **> 500 persons per sq. mile:** There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.
- **100- 500 persons per sq. mile:** There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.
- **< 100 persons per sq. mile:** There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.

► Population near hazard

- **26 or more structures:** There are 26 or more inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.
- **16 to 25:** There are 16-25 inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.
- **11 to 15:** There are 11-15 inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.
- **6 to 10:** There are 6-10 inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.
- **1 to 5:** There are 1-5 inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.
- **0:** There are no inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.



EHE Definitions - Receptors

► Types of activities/structures

- **Residential or educational, or commercial:** Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary or, within the MRS's boundary that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, play grounds, community gathering areas, religious sites or sites used for subsistence hunting, fishing, and gathering.
- **Parks and recreational areas:** Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary or, within the MRS's boundary that are associated with any of the following purposes: parks, nature preserves or other recreational uses.
- **Agricultural, forestry, subsistence:** Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary or, within the MRS's boundary that are associated with any of the following purposes: agriculture, forestry.
- **Industrial or warehousing:** Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary or, within the MRS's boundary that are associated with any of the following purposes: industrial activities or warehousing.
- **No known or recurring activities:** There are no known or recurring activities occurring up to 2 miles from the MRS's boundary or within the MRS's boundary.



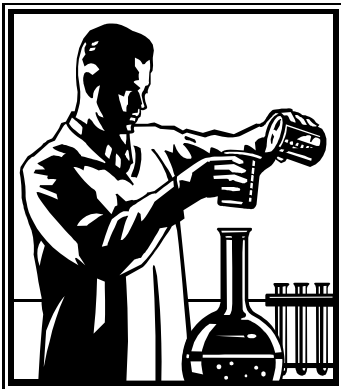
EHE Definitions - Receptors

► Ecological and/or Cultural Resources

- **Ecological and cultural resources are present:** There are both ecological and cultural resources present on the MRS.
- **ecological resources are present:** There are ecological resources present on the MRS.
- **Cultural resources are present:** There are cultural resources present on the MRS.
- **No ecological or cultural resources are present:** There are no ecological resources or cultural resources present on the MRS.



Chemical Warfare Materiel Hazard Evaluation Module





CWM Hazard Evaluation (CHE)

CWM Hazard Evaluation Module Ratings

Total Score from all elements

• Hazard Evaluation A (Highest)

>92

• Hazard Evaluation B

82 - 91

• Hazard Evaluation C

71 - 81

• Hazard Evaluation D

60 - 70

• Hazard Evaluation E

48 - 59

• Hazard Evaluation F

38 - 47

• Hazard Evaluation (Lowest)

CWM Configuration 30

- Chemical, explosive configuration (used or damaged) 30
- CWM mixed with UXO 25
- Chemical, explosive configuration (unused) 20
- Bulk CWM (containerized or in non-explosively configured munition) 15
- CAIS K941 and K942 12
- CAIS (chemical agent identification sets) 10
- Evidence of no CWM 0

Sources of CWM 10

- Live-fire involving CWM 10
- Damaged CWM/DMM or CAIS/DMM, surface or subsurface 10
- Undamaged CWM/DMM or CAIS/DMM, surface 10
- Undamaged CWM/DMM or CAIS/DMM, subsurface 10
- Production facilities of CWM or CAIS 3
- RDT&E (includes research facilities, static testing) 2
- Individual soldier training (includes liquid agent training, decontamination training) 2
- Storage and transfer of CWM 1
- Evidence of no CWM 0

Location of CWM 25

- Confirmed Surface 25
- Confirmed Subsurface, active 20
- Confirmed Subsurface, stable 15
- Suspected (physical evidence) 10
- Suspected (historical evidence) 5
- Subsurface, physical constraint 0
- Evidence of no CWM 0

Ease of Access 10

- No barrier 10
- Barrier is incomplete 8
- Barrier complete, not monitored 5
- Barrier is complete and monitored 0

Status of Property 5

- Non-DoD control 5
- Scheduled for transfer from DoD control 3
- DoD control 0

Population Density (people/sq mi) 5

- > 500 5
- 100 - 500 3
- < 100 1

Population near Hazard 5

- 26 or more inhabited structures 5
- 16 to 25 4
- 11 to 15 3
- 6 to 10 2
- 1 to 5 1
- 0 0

Types of Activities/Structures 5

- Residential, educational, etc. 5
- Recreation (hiking, hunting, etc.) 4
- Agricultural, forestry, subsistence 0

Ecological or Cultural Resources 5

- Evaluation Pending 5
- No Longer Required 3
- Ecological and Cultural Resources 3
- No Known or Suspected CWM Hazard 3
- None 0



CHE Definitions – CWM Hazard

▶ CWM Configuration

- **CWM, explosive configuration, either UXO or damaged DMM** — The CWM known or suspected of being present at the MRS is:
 - Explosively configured CWM that are UXO (i.e., CWM/UXO); or
 - Explosively configured CWM that are DMM that have been damaged (CWM/DMM).
- **CWM mixed with UXO** — The CWM known or suspected of being present at the MRS are CWM/DMM that are co-mingled with conventional munitions that are UXO.
- **CWM, explosive configuration that are DMM (unused)** — The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.
- **CWM, not explosively configured or CWM, bulk container** — The CWM known or suspected of being present at the MRS is:
 - Non-explosively configured CWM/DMM
 - Bulk CWM/DMM (e.g. ton container)
- **CAIS K941 and CAIS K942** — The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K941-toxic gas set M-2/E11.
- **CAIS (chemical agent identification sets)** — The CWM known or suspected of being present at the MRS are only CAIS/DMM. The CAIS present cannot include CAIS K941, toxic gas set M-1; or K942, toxic gas set M-2/E11 for the MRS to be assigned this rating.
- **Evidence of no CWM** — Following investigation, the physical evidence and the historical evidence indicate that CWM are not present at the MRS.



CHE Definitions – CWM Hazard

► Sources of CWM

- **Live-fire involving CWM —**
 - The MRS is a range that supported live-fire of explosively configured CWM and the CWM/UXO are known or suspected of being present on the surface or in the subsurface.
 - The MRS is a range that supported live-fire with conventional munitions, and CWM/DMM, are on the surface or in the subsurface co-mingled with conventional munitions that are UXO.
- **Damaged CWM/DMM or CAIS/DMM, surface or subsurface —** There are damaged CWM/DMM on the surface or in the subsurface at the MRS.
- **Undamaged CWM/DMM or CAIS/DMM, surface —** There are undamaged CWM/DMM on the surface at the MRS.
- **Undamaged CWM/DMM or CAIS/DMM, subsurface —** There are undamaged CWM/DMM in the subsurface at the MRS.
- **Production facilities of CWM or CAIS —** The MRS is a facility that engaged in production of CWM, and there are CWM/DMM suspected of being present on the surface or in the subsurface.
- **Research, Development, Testing, and Evaluation (RDT&E) facility using CWM or CAIS —** The MRS is at a facility that was involved in non-live fire RDT&E activities (including static testing) involving CWM, and there are CWM/DMM suspected of being present on the surface or in the subsurface.
- **Training facility using CWM or CAIS —** The MRS is a location that was involved in training activities involving CWM and/or CAIS (e.g., training in recognition of CWA, decontamination training) and CWM/DMM are suspected of being present on the surface or in the subsurface.
- **Storage or transfer points of CWM —** The MRS is a former storage facility or transfer point (e.g., inter-modal transfer) for CWM.
- **Evidence of no CWM, CWA-media, CWA-debris, or CAIS —** Following investigation, the physical evidence and historical evidence indicates that CWM are not present at the MRS.



CHE Definitions - Accessibility

► Location of Munitions

- **Confirmed Surface:** Physical evidence indicates there are CWM on the surface of the MRS. Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.
- **Confirmed Subsurface, Active:** Physical or historical evidence indicates the presence of CWM in the subsurface of the MRS and the geological conditions at the MRS are likely to cause CWM to be exposed in the future by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action) or there are on-going intrusive activities (e.g., plowing, construction, dredging) at the MRS that are likely to expose CWM.
- **Confirmed Subsurface, Stable:** Physical or historical evidence indicates the presence of CWM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause CWM to be exposed in the future by naturally occurring phenomena, or there are no intrusive activities at the MRS that are likely to occur, or if the activities do occur, are likely to cause CWM to be exposed.
- **Suspected (physical evidence):** There is physical evidence other than the documented presence of CWM, indicating that CWM may be present at the MRS.
- **Suspected (historical evidence):** There is historical evidence indicating that CWM may be present at the MRS.
- **Subsurface, physical constraint:** The physical or historical evidence indicating the CWM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the CWM.
- **Evidence of no munitions:** Following investigation of the MRS, there is physical evidence there are no CWM present or there is historical evidence indicating that no CWM are present.



CHE Definitions – Accessibility

▶ Ease of Access

- **No barrier:** There is no barrier preventing access to all parts of the MRS (i.e., all parts of the MRS are accessible).
- **Barrier to MRS access is incomplete:** There is a barrier preventing access to parts of the MRS, but not the entire MRS.
- **Barrier to MRS access is complete, but not monitored:** There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.
- **Barrier to MRS access is complete and monitored:** There is a barrier preventing access to all parts of the MRS, and there is active continual surveillance (e.g., by a guard, video monitoring) to ensure that the barriers are completely effective at preventing access to all parts of the MRS.

The term *barrier* includes natural obstacles (e.g., difficult terrain, dense vegetation, deep or fast moving water), man-made obstacles (e.g., fencing), and combinations of natural and man-made obstacles.

▶ Property status

- **Non-DoD control:** The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by the DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by a Native American or Alaskan Native governments or State or local governments, lands or water bodies managed by other Federal agencies.
- **Scheduled for transfer from DoD control:** The MRS is on land or a water body that is owned, leased, or otherwise possessed by the DoD and DoD plans to transfer that land or water body to control of another entity (e.g., a State, Native American, Alaskan Native, or local government; a private party; another Federal agency) within 3 years from the date the Protocol is applied.
- **DoD controlled:** The MRS is on land or is a water body MRS is that is owned, leased, or otherwise possessed by the DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24-hours per day, every day of the calendar year.



CHE Definitions – Receptors

► Population density

- **> 500 persons per sq. mile:** There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.
- **100- 500 persons per sq. mile:** There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.
- **< 100 persons per sq. mile:** There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.

► Population near hazard

- **26 or more structures:** There are 26 or more inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.
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- **0:** There are no inhabited structures located up to a 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.



CHE Definitions – Receptors

► Types of activities/structures

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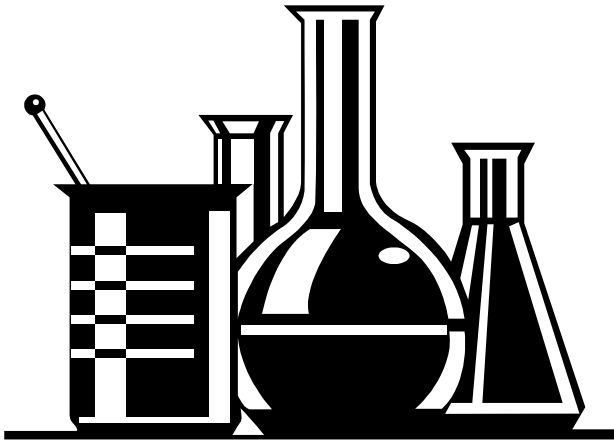
CHE Definitions - Receptors

► Ecological and/or Cultural Resources

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- **Ecological resources are present:** There are ecological resources present on the MRS.
- **Cultural resources are present:** There are cultural resources present on the MRS.
- **No ecological or cultural resources are present:** There are no ecological resources or cultural resources present on the MRS.



Relative Risk Site Evaluation Module





Contaminant Hazard Factor

- ▶ Comparison of maximum concentrations of contaminants in each medium present at the site to RRSE comparison values

$$CHF = \sum \frac{[\text{Maximum Concentration of Contaminant A}]}{\text{Comparison Value for Contaminant A}}$$

- ▶ Three possible outcomes:
 - Significant: CHF > 100
 - Moderate: 100 ≥ CHF ≥ 2
 - Minimal: CHF < 2



Mechanics of CHF Calculation

- ▶ Calculate CHF for each contaminant in each medium and add answers together

<u>Contaminants</u>		<u>Calculation*****</u>	<u>Rating</u>
Carcinogen A:	$[A]^*_{\max}$	$\frac{[A]^*_{\max}}{\text{Std}^{**}} + \frac{[B]_{\max}}{\text{Std}^{**}} + \frac{[C]_{\max}}{\text{Std}^{***}} = X_1$	$>100 = \text{Significant CHF}$ $2-100 = \text{Moderate CHF}$ $<2 = \text{Minimal CHF}$
Carcinogen B:	$[B]_{\max}$		
Non-carcinogen C:	$[C]_{\max}$		
Ecological D:	$[D]_{\max}$	$\frac{[D]_{\max}}{\text{Std}^{****}} = X_2$	
$[A]^*$ - Maximum concentration in medium Std^{**} - Comparison value based on 10^{-4} human cancer incidence Std^{***} - Comparison value based on reference dose for humans Std^{****} - Comparison value for ecological receptors where available *****Use comparison values in Appendix B Note: Contaminants posing a threat to ecological receptors (i.e., ecological contaminants) must be evaluated separately from those posing a threat to human receptors			



Migration Pathway Factor

- ▶ Each media pathway evaluated (surface water, sediment, groundwater, and soil)
- ▶ Three possible outcomes:
 - Evident: Analytical data or observable evidence indicates that contamination in the groundwater is moving or has moved away from the source area.
 - Potential: Contamination in the groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information not sufficient to make determination of Evident or Confined
 - Confined: Information indicates that the potential for contaminant migration from the source via the groundwater is limited due to geological structures or physical controls.
- ▶ Opportunity for technical input from regulators and community



Receptor Factor Evaluation

- ▶ Receptors (human or sensitive ecological species/environments) evaluated for each media
- ▶ Three possible outcomes:
 - Identified: Receptors are threatened or have access to potentially contaminated media
 - Potential: Receptors are not threatened but have potential access to media of concern
 - Limited: Receptors are not threatened or have little or no access to potentially contaminated media
- ▶ Opportunity for technical input from regulators and community



Relative Risk Site Evaluation (RRSE)

Concentration of Contaminant

- Significant: CHF > 100
- Moderate: 2 - 100
- Minimal: CHF < 2

Media Pathway

- Evident
- Potential
- Confined

Human or Sensitive Ecological Species/ Environments

- Identified
- Potential
- Limited

Combining the three factors of RRSE

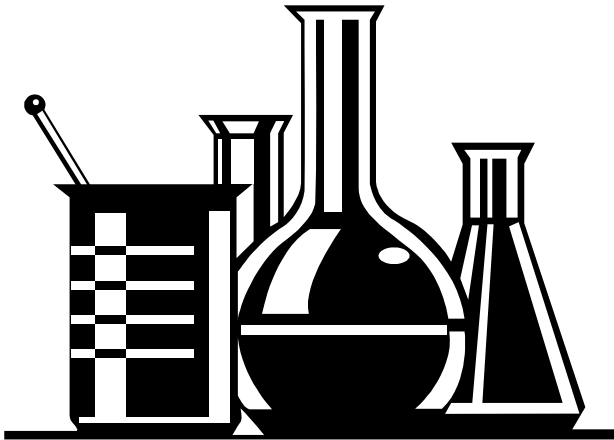
		Receptor Factor	Migration Pathway Factor		
			Evident	Potential	Confined
Contaminant Hazard Factor	Significant	Identified	High	High	Medium
		Potential	High	High	Medium
		Limited	Medium	Medium	Low
	Moderate	Identified	High	High	Low
		Potential	High	Medium	Low
		Limited	Medium	Low	Low
	Minimal	Identified	High	Medium	Low
		Potential	Medium	Low	Low
		Limited	Low	Low	Low

RRSE Module Ratings

- High
- Medium
- Low
- Evaluation Pending
- No Longer Required



Putting it all together





EHE, CHE, and RRSE Evaluations Combined

Select the highest priority (lowest number) among the three hazard evaluation modules

EHE Module Rating		CHE Module Rating		RRSE Module Rating	
		Hazard Evaluation A (Highest)	1		
Explosive Hazard A (Highest)	2	Hazard Evaluation B	2	High (Highest)	2
Explosive Hazard B	3	Hazard Evaluation C	3		
Explosive Hazard C	4	Hazard Evaluation D	4		
Explosive Hazard D	5	Hazard Evaluation E	5	Medium	5
Explosive Hazard E	6	Hazard Evaluation F	6		
Explosive Hazard F	7	Hazard Evaluation G (Lowest)	7		
Explosive Hazard (Lowest)	8			Low (Lowest)	8
No Longer Required		No Longer Required		No Longer Required	
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard			



Consideration of Other Factors in Sequencing Decisions

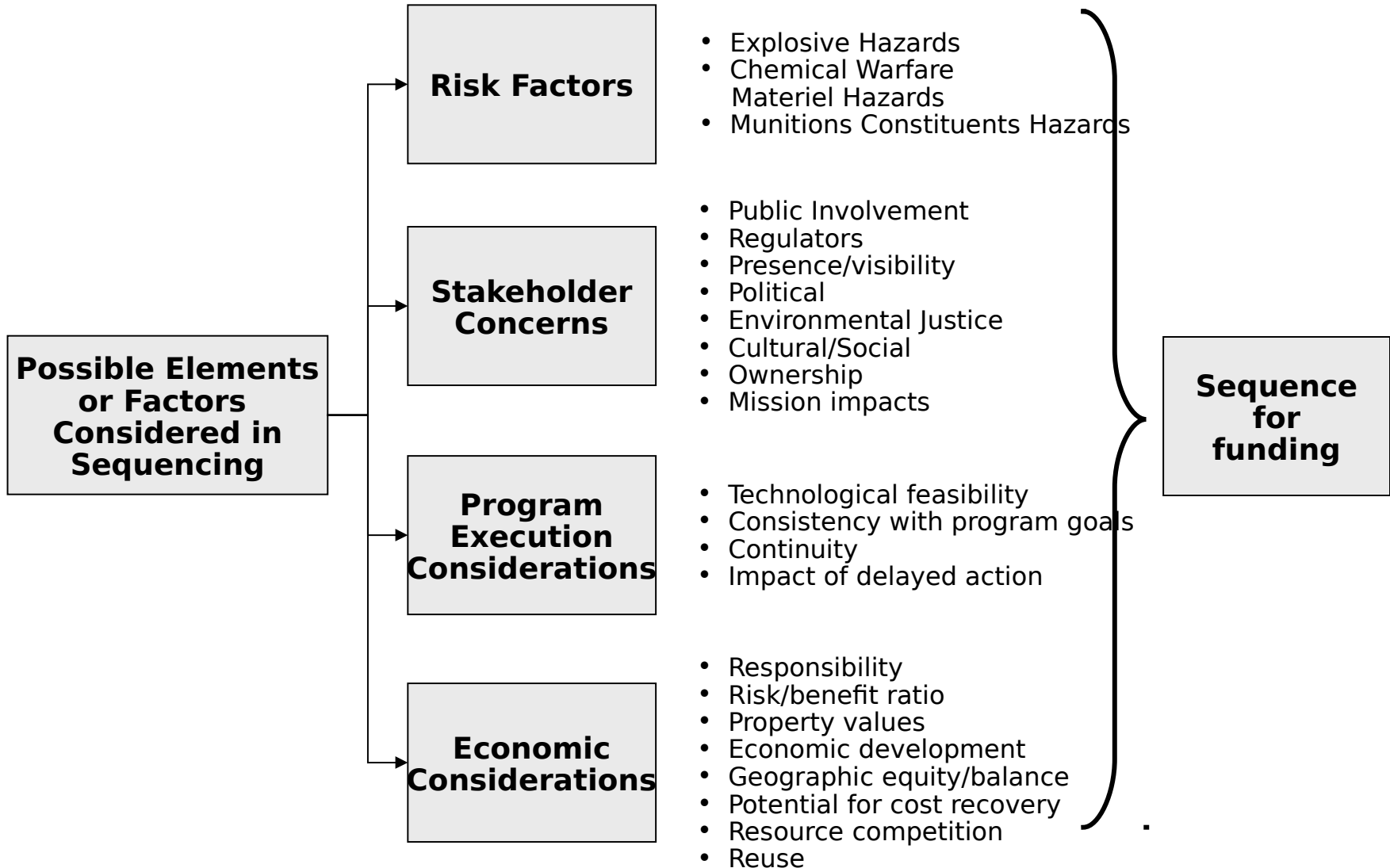


Other Considerations' Role in Sequencing Decisions

- ▶ Sequencing of military munitions response areas and sites for action will be based primarily on the relative priority assigned by the Protocol.
- ▶ DoD will also consider other factors that may warrant consideration at specific defense sites
- ▶ Generally, sites that present a greater relative risk to human health, safety, or the environment will be addressed before sites that present a lesser risk.
- ▶ In evaluating other factors in its sequencing decisions, DoD will consider a broad range of issues.



Other Considerations' Role in Sequencing Decisions (cont.)





Procedures and Documentation for Sequencing Decisions

- ▶ Each installation or FUDS is required to develop and maintain a Management Action Plan (MAP) or its equivalent.
 - The MAP will be updated on at least an annual basis.
 - During the annual update of the MAP, installation or FUDS personnel will be required to publish an announcement in a local community publication notifying the public of the following:
 - The existence of the site, including a brief description of the site, the conditions at the site, and the priority currently assigned
 - The intention to develop or update the MAP for the site
 - The intention to apply the site prioritization protocol to the site
 - The specific means the public can use to submit information about the site that may influence the priority assigned or the funding sequence assigned, and
 - The name and contact information for the designated DoD spokesperson for the site.
 - Sequencing decisions at installations and FUDS will be developed with input from stakeholders, such as the regulatory and community members of an installation's Restoration Advisory Board, and be documented in the MAP.

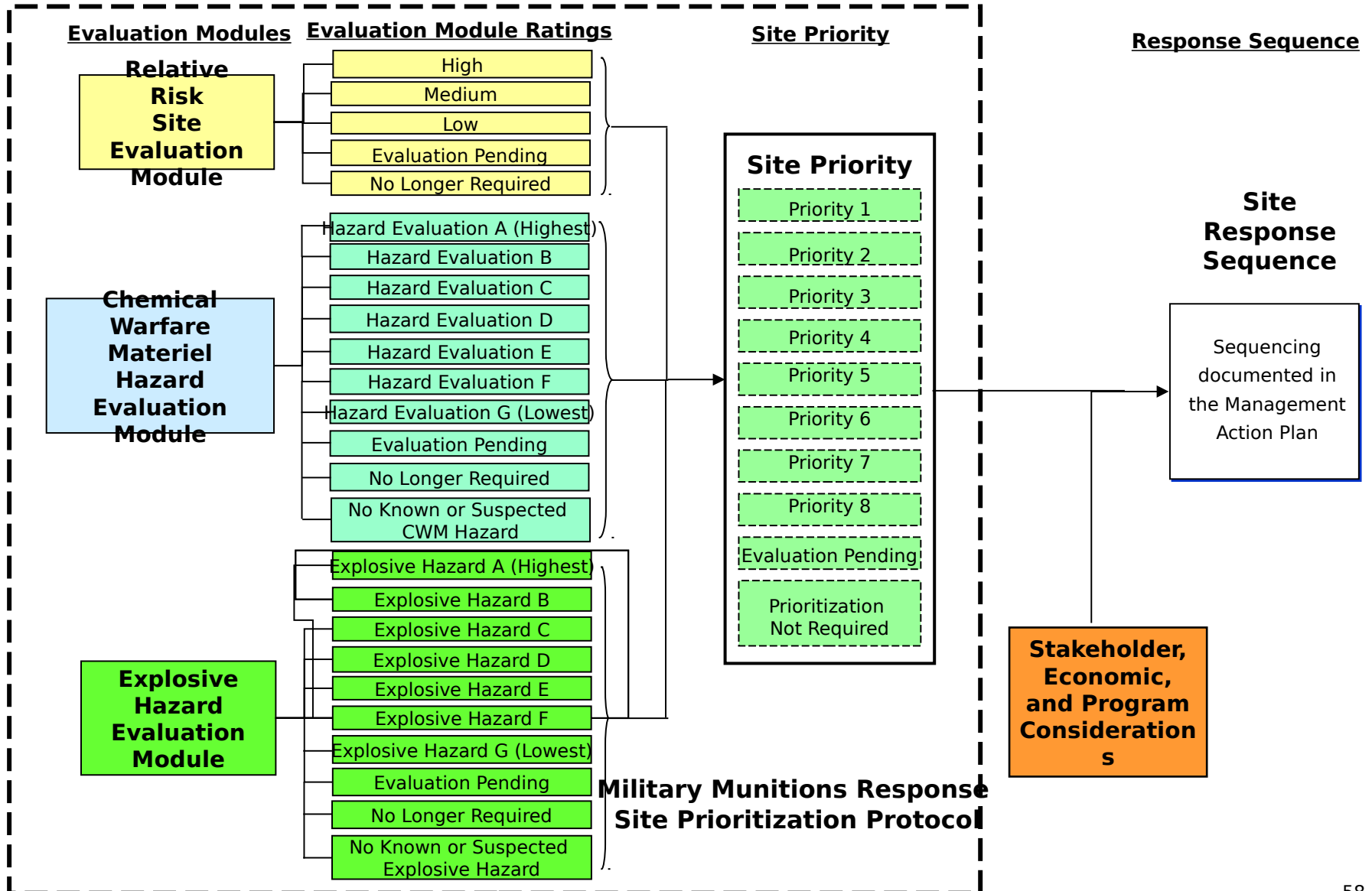


Procedures and Documentation for Sequencing Decisions (cont.)

- ▶ Final sequencing may be impacted by program management considerations within the Component chain of command.
 - If the sequencing of a munitions response area or site is changed from the sequencing reflected in the current MAP, information documenting the reasons for the sequencing change will be provided for inclusion in the MAP.
 - Notice of the change in the sequencing will be provided to those stakeholders that provided input to the sequencing process.
- ▶ In addition to the information on prioritization, DoD Components will ensure that information provided by stakeholders that may influence the sequencing of a site is included in the Administrative Record and the Information Repository.
- ▶ Sequencing results will be reported by each Component and published in the DERP Annual Report to Congress.
- ▶ If sequencing decisions result in action at a lower risk site ahead of sites with a higher risk, specific justification will be provided.



Integration of Priority with Sequencing Considerations





MMRP Site Prioritization Protocol Schedule

- ▶ Finalize draft rule within DoD
 - Expected in late August 2003
- ▶ Publication in *Federal Register* for 60-day comment period
 - Extendable by 30 days (90 days total) upon written request
- ▶ Collect, collate, review, respond to comments, prepare draft final Protocol
- ▶ Staff draft final rule
- ▶ Send to OMB, publish in *Federal Register*, apply



Related issues

- ▶ Training on the use and application of the Protocol
 - Need to train DoD, other Federal Agency, State, and Tribal personnel
 - Approaches to conducting training under consideration include:
 - Regionalized and standardized training for DoD, other Federal agency, State, and Tribal personnel
 - Distance-based learning approach similar to regional training
 - Decentralize training responsibility to Services



Summary

- ▶ Protocol to be codified at 32 CFR Part 179
- ▶ Draft of proposed rule to formal coordination
- ▶ Final proposed rule in *Federal Register* for 60-day comment period
- ▶ Address submitted comments
- ▶ Prepare final rule

Additional information is available at:

<https://www.denix.osd.mil//MMRP>